Step 1



Terminations



### **Example: Methylcyclohexane**



**Other Examples:** 



The reaction can utilize either heat ( $\Delta$ ) or light (hv)

Different types of hydrogen can be pulled from a methylcyclohexane in a radical halogenation reaction to give various products. However, one main product is obtained. This is explained in terms of the stability of the radical formed during the reaction process.

## **Stability of radicals:**

- Stability increases with alkyl substitution
- Alkyl groups are polarizable and donate electrons to electron deficient sites better than hydrogens (this is called **inductive effect** and occurs through sigma bonds)



### Or it can be summarized from least to most stable radicals:

·CH <sub>3</sub> <	CH <sub>2</sub> R	< ·CHR <sub>2</sub>	< 'CR <sub>3</sub>
methyl	primary (1	°) secondary (2	$(2^{\circ})$ tertiary $(3^{\circ})$
radical	radical	radical	radical
(least stabl	e)		(most stable)

# **More Examples**

## A. 1,1,3-trimethylcyclopentane bromination



1,1,3-trimethylcyclopentane

## B. 2,2,4-trimethylpentane chlorination



2,2,4-trimethylpentane



# 1,1,4-trimethylcyclohexane



Neopentane (2,2-dimethylpropane)



2, 5-dimethylhexane